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ORIGINAL PAPER

Parenting practices in childhood and depression, anxiety, and internalizing symptoms in adolescence: a systematic review

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Abstract

Purpose Parenting practices represent important and modifiable factors for health and wellbeing in children and adolescents; however, strength and quality of studies examining relationships between parenting practices in childhood and risk of depression and anxiety in adolescence are unclear. The objective of this systematic review was to synthesize the longitudinal literature that describes these associations.

Methods Six electronic databases were searched for articles published through March 2018. Eligible articles were published in the English language, peer-reviewed, and had prospective cohort study designs. Articles eligible for inclusion examined positive and negative parenting practices of parents and/or guardians when study subjects were between 0 and 9 years of age, and symptoms of depression, anxiety, and internalizing symptoms when subjects were between 10 and 19 years of age. Heterogeneity of included articles precluded meta-analysis: findings were reported narratively.

Results 4558 references were screened for inclusion, and 19 articles met eligibility criteria and were included for review. Ten articles examined positive parenting practices, and four demonstrated statistically significant associations between positive parenting practices and lower risk of adolescent depression, anxiety, and/or internalizing symptoms. Fifteen articles examined negative parenting practices, and five demonstrated significant associations between negative parenting practices and higher risk of adolescent depression, anxiety, and/or internalizing symptoms.

Conclusion This review demonstrates that the evidence base supporting longitudinal associations between parenting practices in childhood and adolescent symptoms of depression, anxiety, and internalizing problems is inconsistent. Findings from this review highlight limitations of the existing literature and identify understudied parenting dimensions that require further investigation.

Keywords Adolescence · Parenting · Depression · Anxiety · Internalizing

Introduction

Adolescence represents a critical period of development, defined by key processes including growing independence, exploring one's interests, forming healthy peer relationships, acquiring skills for life and the workplace, and transitioning to higher education and/or the labor force [1, 2]. However, rates of depression and anxiety sharply rise in the transition between childhood and adolescence [3], and both disorders are highly prevalent in youth. For example, annual prevalence estimates suggest that up to 31.9% and 14.3% of adolescents aged 13–18 report experiencing clinically significant symptoms of anxiety and depression, respectively [4]; comorbidity between depression and anxiety, as well as other mental health disorders, is also common [4, 5]. These

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estimates are particularly concerning, given that earlier onset of depression or anxiety increases the likelihood of recurrence later in life [6, 7]. Experiencing depression or anxiety during adolescence can also disrupt key developmental processes, which can lead to a number of negative outcomes in adulthood, including lower income, lower educational attainment, and loneliness [8, 9]. Ultimately, the consequences of experiencing depression and/or anxiety in adolescence can be severe, highlighting the need for strategies that target symptoms early in life to prevent onset or minimize long-term risk.

Efforts to both prevent and treat depression and anxiety in adolescents often identify the family unit as an important target for intervention [10, 11], because a number of significant and potentially modifiable risk factors involve parents or the broader home environment. For example, exposure to parental psychopathology, particularly early in life, is strongly associated with risk of depression and anxiety in offspring [12, 13]. Exposure to other factors, including interparental conflict and neglect, is also linked to symptoms of depression and anxiety in children and adolescents [14, 15]. Families represent valuable targets for prevention and intervention efforts, because educating parents and family members about potential risk factors for depression and anxiety can serve to prevent onset of symptoms [16, 17]. Similarly, promoting awareness of how depression and anxiety manifest in adolescents to those who are closest to them (e.g., parents, teachers, and peers) can lead to earlier detection and treatment [16, 17], potentially mitigating their negative short- and long-term consequences.

An emerging body of evidence further suggests that targeting specific parenting practices early in development may be effective in improving long-term risk of negative outcomes in children and adolescents, including their mental health [18, 19]. For example, early-life interventions that promote parental warmth and sensitivity, appropriate monitoring, and consistent and effective disciplinary practices have demonstrated positive impacts on adolescent adjustment, academic performance, and mood [18, 20, 21]; a recent meta-analysis suggests that the positive impacts of these programs can last for over a decade [19]. This is particularly promising in light of a growing number of studies that demonstrate associations between parenting and mental health in children and adolescents. For example, harsh disciplinary practices, including physical punishment and harsh criticism, have demonstrated robust concurrent associations with an increased risk of internalizing symptoms in childhood and adolescence [22–25]; conversely, parental warmth and sensitivity have been associated with lower risk [22–25]. Although fewer studies have examined prospective associations between parenting practices in childhood and adolescent depression and anxiety, a growing number of longitudinal studies are being published. Prospective, longitudinal research is particularly important for minimizing recall bias, and in particular, establishing temporality to better ascertain whether parenting practices influence adolescent mental health, or are employed in response to adolescent behaviors [26–28]. As a result, to foster both continued research and the uptake of existing evidence into clinical practice and policy, there is a need to synthesize the prospective, longitudinal evidence base that describes associations between parenting practices in childhood and depression, anxiety, and internalizing symptoms in adolescence. This will allow for improved understanding of the potential magnitude of these relationships by discerning which parenting practices may have the largest long-term impact on adolescent depression and anxiety, and further serve to identify areas that require further investigation.

Although a number of reviews have examined aspects of parenting and their relationships with depression and anxiety in children and adolescents, most have limitations. For example, a major limitation for some existing reviews is that they synthesize only cross-sectional studies [22, 23]. Reviews have also been limited by examination of only depressive symptoms, or only symptoms of anxiety [22, 23, 29, 30]. Depression and anxiety share a number of similar risk factors [31–33], and recent reviews and commentaries have called for the development and implementation of transdiagnostic approaches to prevent and treat both depression and anxiety, citing enhanced generalizability, ease of application, and lower cost [33–35]. Some reviews have included longitudinal literature, but have combined these studies with cross-sectional research in narrative syntheses or meta-analyses [29, 30]. Furthermore, existing reviews that have examined longitudinal studies have been focused on select developmental periods (e.g., childhood or adolescence only) [24, 25], thus excluding studies that span multiple periods of development (e.g., early childhood through adolescence). Finally, some reviews include only select parenting practices to the exclusion of others, typically due to adherence to specific theoretical frameworks, thus limiting their scope [36–38]. To date, no systematic reviews have summarized the evidence base examining associations between parenting practices in childhood and risk of depression, anxiety, and/or internalizing symptoms in adolescence. As a result, the objective of this systematic review was to synthesize studies summarizing these associations.

Methods

Methods and reporting for this systematic review are consistent with the PRISMA statement [39], and a PRISMA checklist is provided in Appendix 1.

Search strategy and selection criteria

A comprehensive literature search was conducted in the following six electronic databases: Medline (via Ovid), Embase (via Ovid), PsycINFO (via Ovid), CINAHL (via EBSCOHost), ERIC (via Ovid), and PubMed. Search strategies for Medline, Embase, and PsycINFO are presented in Appendix 2. Searches began at the date of inception of each database, with a cut-off date of July 25, 2017. Publications were restricted to cohort studies and human studies, with no initial restrictions for language. 6979 references were retrieved from the searched databases and entered into an Endnote file for processing ($n = 4128$ after duplicate removal). To supplement database searches, reference lists and citing articles of studies eligible for inclusion were scanned, and relevant citations were subsequently screened for inclusion; this yielded an additional 193 references ($n = 175$ after duplicate removal). An updated literature search was conducted in the aforementioned databases in April 2018, with searches covering the timeframe from July 1, 2017 to March 31, 2018; this yielded an additional 454 references ($n = 255$ after duplicate removal).

Studies eligible for inclusion in this review examined parenting practices of parents and/or guardians when children were between 0 and 9 years of age. Parenting practices in childhood were defined a priori as including: positive parenting, negative parenting, harsh discipline, sensitivity, monitoring, and warmth. We also include studies examining practices including parental emotionality/affect, parental consistency, parental acceptance, parental or psychological overcontrol, non-aggressive discipline, physical punishment, responsiveness, and overreactive parenting. Parenting practices examined in included studies, and their definitions, are described in Supplementary Table 1; parenting practices are broadly categorized into "positive" and "negative" categories in line with recommendations provided by the existing literature [40, 41]. Eligible studies had prospective study designs, with a minimum of 12 months between exposure and outcome ascertainment. Eligible studies also examined symptoms of depression, symptoms of general anxiety or specific anxiety disorders (e.g., social anxiety), and internalizing behaviors when subjects were between the ages of 10 and 19 years. Age ranges utilized in this review are in line with the definitions of early childhood and adolescence described by the World Health Organization (WHO) [42, 43]; as well as definitions employed by prior systematic reviews in this area [24, 25, 44].

Five independent reviewers screened titles and abstracts of references to determine eligibility. Remaining citations underwent full-text review, with two independent reviewers retrieving and reviewing full-text articles. Differences at each stage were resolved by consensus. Title and abstract, and full-text review were both conducted using Covidence [45]. When multiple eligible articles examining the same cohort of individuals were found, articles using the most recent follow-up data were retained for review. A PRISMA flowchart describing the selection process is presented in Fig. 1.

Quality assessment

Two independent reviewers examined methodologic quality of included articles using the Newcastle–Ottawa Scale [46], a quality assessment tool used for nonrandomized studies. The Newcastle–Ottawa Scale is recommended by the Cochrane Handbook for assessing risk of bias at the study-level [47], and has good content and face validity [48]. The Newcastle–Ottawa Scale uses a star rating system; up to ten stars were assigned for items grouped into three categories assessing selection of study groups, comparability, and outcomes. Star ratings also were used to comment on the potential risk of bias present within and across articles. To examine reliability of quality ratings, the kappa (κ) statistic was calculated to measure interobserver agreement.

Data extraction and analysis

Data were extracted from eligible articles by two independent reviewers following full-text review, and entered into a computerized extraction form developed a priori. Data items extracted included sample size, age at exposure, age at outcome ascertainment, country, type of parenting examined, measures of depression, anxiety, or internalizing symptoms, covariates, and measures of association. Descriptive characteristics of included studies were summarized in-text and in table format (Table 1). Due to substantial methodological heterogeneity across included studies, including the use of several different exposures and outcomes, inconsistent adjustment for covariates, and the use of various analytic approaches, we were not able to conduct meta-analyses. Findings are presented as a narrative synthesis of included studies, with results broadly grouped in tabular form by exposure category (positive or negative parenting practices).

Results

In total, 4558 articles were screened for inclusion, and 19 articles met inclusion criteria and were included in this review. A PRISMA flowchart summarizing this process is included in Fig. 1. A list of articles excluded at the full-text stage, with reasons for their exclusion, is presented in Supplementary Table 2.

Characteristics of included articles are provided in Table 1. The 19 included articles represented samples from 8 countries. One article was from Belgium, two were from

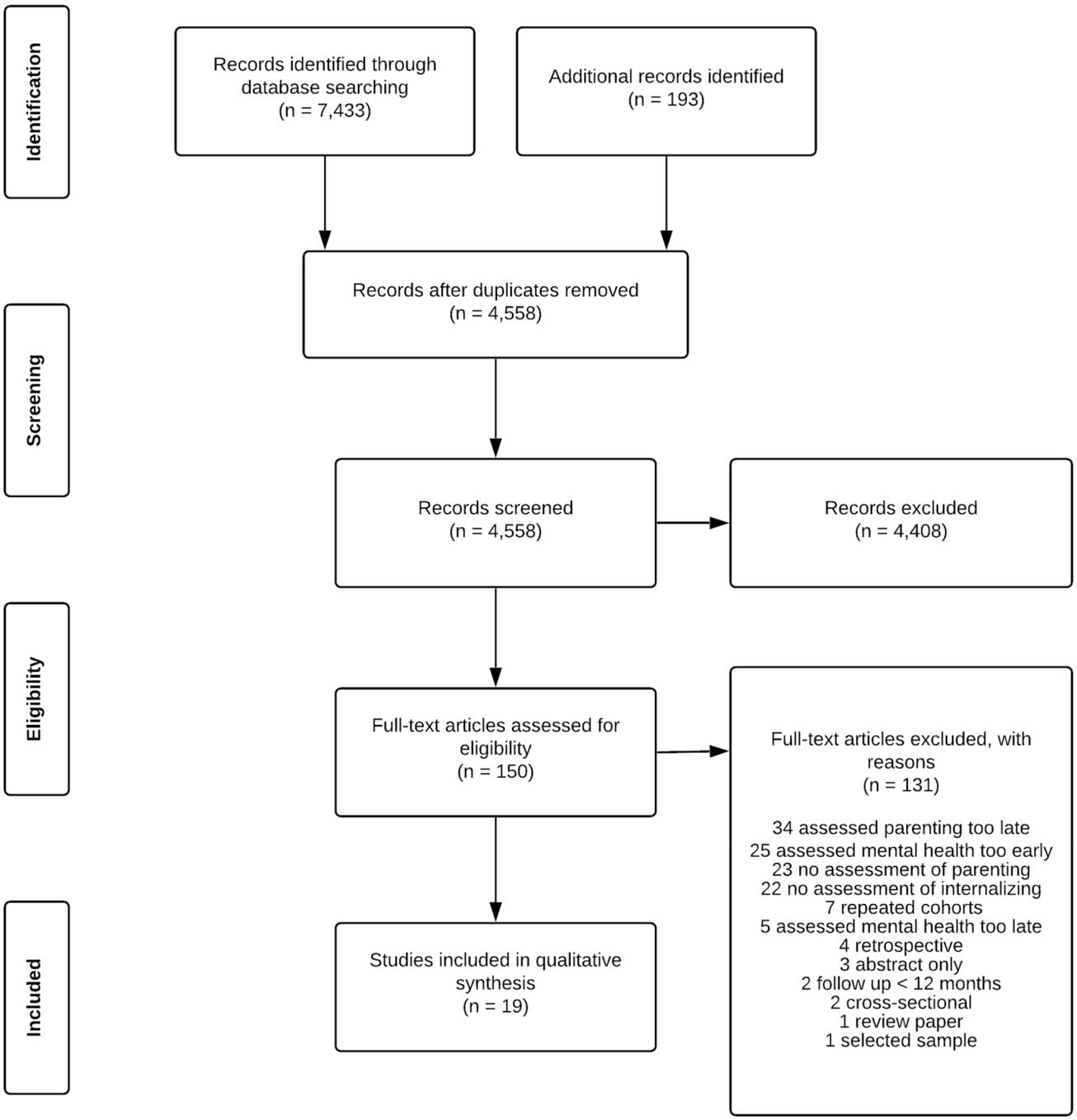

Fig. 1 PRISMA flowchart

Canada, one was from Germany, two were from the Netherlands, one was from New Zealand, one was from Spain, three were from the United Kingdom, and eight were from the United States. Analytic sample sizes ranged from 50 to 13,292 participants. The unweighted mean age at initial exposure ascertainment was 5.22 years (SD = 2.97, range = 4 weeks to 9.1 years). The unweighted mean age at outcome ascertainment was 13.50 years (SD = 2.49, range = 10.03–18 years). Average follow-up duration was 8.76 years (SD = 4.52, range = 1–18 years).

Quality ratings using the Newcastle–Ottawa scale are presented in Table 2. Total star ratings ranged from 4 to 9 out of 10 stars. The mean star rating was 2.74 out of 4 stars for study selection, 1.05 of 3 stars for comparability, and 2.79 of 3 stars for outcome measurement. The majority of studies included for review were of moderate methodological

Table 1 Characteristics of included articles ($n = 19$)

Article	Analytic sample size	Type and measure of parenting	Type and measure of internalizing	Age at exposure mean (SD)	Age at outcome mean (SD)	Follow-up duration	Country of origin	Covariates	Sex/gender differences
Baumrind et al. [59]	134	Negative, Parent Disciplinary Rating Scale (PDRS)	Internalizing, Child Behavior Problem Scales	4.5 (0.43)	15.1 (0.48)	10 years	United States	Pre-existing differences, IQ, externalizing	None reported
Bellamy and Hardy [53]	1715	Positive, Negative; Parent Practices Scale	Depression, Centre for Epidemiologic Studies—Depression (CES-D)	4–8	16–20	12 years	Canada	Age, parental depression, anxiety/depression, aggression, positive interaction, biological parent, parenting measures	No
Cecil et al. [62]	2592	Negative, study-specific items	Emotional difficulties, Strengths and Difficulties Questionnaire (SDQ)	3–9	12	9 years	United Kingdom	Self-control, conduct problems	No
Davis, Votruba-Drzal, and Silk [49]	881	Positive (observation task), Negative (Raising Children Checklist)	Internalizing, Child Behavior Checklist (CBCL)	6 months to 4.5 years	10–15	15 years	United States	None	No
Duchesne et al. [54]	2000	Positive, Negative; Emotional Climate for Children Questionnaire	Anxiety, Social Behavior Questionnaire	5.99 (0.29)	12	6 years	Canada	None	None reported

Table 1 (continued)

Article	Analytic sample size	Type and measure of parenting	Type and measure of internalizing	Age at exposure mean (SD)	Age at outcome mean (SD)	Follow-up duration	Country of origin	Covariates		Sex/gender differences
Ezpeleta et al. [63]	72	Negative; Parental Monitoring Scale	Internalizing, Diagnostic Interview for Children and Adolescents	9	10–11	2 years	Spain	Family composition, risk clusters, physical and psychosocial history, adverse events, cognitive development	None reported	
Feehan et al. [64]	849	Negative, study-specific scale	Internalizing, Diagnostic Interview Schedule for Children (DISC)	7 and 9	15	8 years	New Zealand	Sex, family adversity, maternal mental health, early problem behavior	No	
Feng et al. [51]	225	Positive, negative; observational task	Depressive symptoms, Kiddie Schedule for Affective Disorders and Schizophrenia (K-SADS)	9.1 (0.48)	10.03 (0.41)	1 year	United States	Race, poverty, emotion regulation, baseline depression	Study of females only	
Ginsburg et al. [55]	50	Positive, negative; observational task	Anxiety, Baltimore How I Feel Anxiety Subscale	5.86	12–13	6 years	United States	None	None reported	

Table 1 (continued)

Article	Analytic sample size	Type and measure of parenting	Type and measure of internalizing	Age at exposure mean (SD)	Age at outcome mean (SD)	Follow-up duration	Country of origin	Covariates		Sex/gender differences
Hannigan, McAdams, and Eley [65]	13,292	Negative; semi-structured interview (adapted from HOME scale)	Depressive symptoms, Short Mood and Feelings Questionnaire (SMFQ)	9	12 and 16	3–7 years	United Kingdom	None	None reported, analyses stratified	
Kuhlman, Olson, and Lopez-Duran [50]	65	Positive, negative; parenting dimensions inventory (PDI)	Global internalizing scale, Teacher's Report Form	5.79 (0.3)	10.5 (0.46)	6 years	United States	Internalizing (baseline), other parenting dimensions	None reported	
Lansford et al. [57]	585	Positive; Concerns and Constrains interview, study-specific measure	Internalizing, CBCL	Kindergarten	Grade 8	8 years	United States	None	None reported	
Leve et al. [60]	312	Negative, interview with study-specific items	Internalizing, CBCL	5	17	12 years	United States	Income, impulsivity, maternal depression, marital adjustment	None reported	
Lewis-Morrarty et al. [61]	176	Negative; observational task	Social anxiety, Screen for Child Anxiety Related Emotional Disorders (SCARED)	7	15.05 (1.82)	8 years	United States	Behavioral inhibition	No	

Table 1 (continued)

Article	Analytic sample size	Type and measure of parenting	Type and measure of internalizing	Age at exposure mean (SD)	Age at outcome mean (SD)	Follow-up duration	Country of origin	Covariates		Sex/gender differences
Mesman and Koot [66]	332	Negative; interview, study-specific items	Internalizing disorders, DISC	2–3	10–11	8 years	Netherlands	Sex, externalizing, physical health problems, family psychopathology, maternal absence, stressful events, low SES	Adjusted in analyses	
Nikitopoulos et al. [56]	296	Positive; observational task, coded with Category System for Microanalysis of Early Mother–Child Interaction	Internalizing, K-SADS	3 months	15	15 years	Germany	Sex, psychosocial adversity, infant responsiveness	Adjusted in analyses	
Prinzie et al. [67]	290	Negative; overreactivity subscale, Parenting Scale	Internalizing, CBCL	8.81 (0.54)	11.75 (0.5 and 14.75 (0.5)	3–6 years	Belgium	None	None reported	
van der Voort et al. [58]	146	Positive; observational task, Egeland/Erickson 7-point sensitivity rating scale	Internalizing (CBCL)	12–30 months; 7 years	14	13 years	Netherlands	None	No	

Table 1 (continued)

Article	Analytic sample size	Type and measure of parenting	Type and measure of internalizing	Age at exposure mean (SD)	Age at outcome mean (SD)	Follow-up duration	Country of origin	Covariates	Adjusted in analyses	Sex/gender differences
Williams et al. [52]	3894	Positive; study-specific items	Depression, ICD-10 diagnosis	4 weeks, 6 months	18	18 years	United Kingdom	Antenatal depression, maternal education, breast-feeding, number of siblings, marital conflict, maternal age		

quality, and interobserver agreement for quality ratings was high ($\kappa = 0.85$).

Ten of the included articles described relationships between positive parenting practices and offspring depression, anxiety, and internalizing outcomes; findings from these articles are highlighted in Table 3. Four articles demonstrated significant associations between positive parenting practices and child outcomes. In detail, two articles demonstrated associations between higher parental warmth and lower internalizing symptoms [49, 50]. One article found that among girls with low-to-moderate sadness regulation, higher parental acceptance was associated with lower depressive symptoms [51]. Finally, one article found that positive responses to crying infants, a measure of maternal sensitivity, were negatively associated with offspring risk of depression in complete cases and in imputed samples [52]. Of the six articles that demonstrated no significant associations between positive parenting practices and offspring internalizing outcomes, parenting practices examined included parental consistency, maternal warmth, granting of autonomy, proactive parenting, maternal responsiveness, and maternal sensitivity [53–58]. Articles with statistically significant findings had an average quality rating of 7 stars (range = 6–8 stars) on the Newcastle–Ottawa scale; articles with non-significant findings had an average quality rating of 6 stars (range = 4–9 stars). Follow-up duration was identical for significant and non-significant articles, at an average of 10 years.

Fifteen of the included articles described relationships between negative parenting practices and offspring internalizing outcomes; findings from these articles are highlighted in Table 4. Five of the included articles demonstrated significant associations between negative parenting practices and offspring internalizing outcomes. One article found that a number of negative parenting practices, including severe physical punishment, psychological control, and verbal hostility, were associated with higher internalizing symptoms [59]. Another article found that for girls with lower positive affect, higher psychological control from parents was associated with higher depressive symptoms [51]. One article found that practices including negative emotionality and maternal hostility were associated with significantly higher internalizing symptoms [49]. One article demonstrated a significant relationship between harsh parental discipline and higher internalizing symptoms in boys, but not in girls [60]. Finally, one article reported a significant relationship between maternal overcontrol and symptoms of social anxiety; this relationship was also moderated by behavioral inhibition [61]. Of the 10 articles that demonstrated no statistically significant associations between negative parenting practices and offspring internalizing outcomes, practices studied included hostile or harsh discipline, psychological control, harsh criticism, and overreactive

Table 2 Study quality rating (Newcastle–Ottawa Scale)

Article	Component		
	Selection	Comparability	Outcome
Baumrind et al. [59]	★★☆★	☆☆☆	★★★
Bellamy and Hardy [53]	★★★★	★☆★	★★★
Cecil et al. [62]	★★☆☆	★☆☆	★★★
Davis, Votruba-Drzal and Silk [49]	★★★☆	☆☆☆	★★★
Duchesne et al. [54]	★★★☆	☆☆☆	★★☆
Ezpeleta et al. [63]	☆★☆★	☆☆☆	★★★
Feehan et al. [64]	★★☆★	★☆☆	★★★
Feng et al. [51]	☆★★★	★★☆	★★★
Ginsburg et al. [55]	☆★☆☆	☆☆☆	★★★
Hannigan, McAdams, and Eley [65]	★★★★	☆☆☆	★★★
Kuhlman, Olson, and Lopez-Duran [50]	★★★★	☆☆☆	★★★
Lansford et al. [57]	★★★☆	☆☆☆	★★☆
Leve et al. [60]	★★☆★	★★★	★★★
Lewis-Morrarty et al. [61]	★★☆★	★☆☆	★★☆
Mesman and Koot [66]	★★☆★	★★★	★★★
Nikitopoulos et al. [56]	★★☆☆	★★★	★★★
Prinzie et al. [67]	★★★☆	☆☆☆	★★★
van der Voort et al. [58]	☆★☆☆	★☆☆	★★★
Williams et al. [52]	★★☆☆	★★★	★★☆

Black stars denote meeting relevant quality criterion. Stars awarded for selection if studies met following criteria: (1) representative of average child in community; (2) sample drawn from same community regardless of exposure status; (3) exposure measurement completed via validated measure; (4) outcome of interest not present at time of exposure measurement. Stars awarded for comparability if studies met following criteria: (1) studies controlled for gender or examined for potential effect modification; (2) studies controlled for socioeconomic status; (3) studies controlled for maternal depression. Stars awarded for outcome if studies: (1) evaluated outcomes via validated measure; (2) follow-up time to outcomes adequate (12 months or greater); (3) sufficient number of participants completed follow-up (attrition < 15%) or if adequate description of those lost to follow-up is provided

parenting [50, 53–55, 62–67]. Average follow-up duration for articles showing significant associations was 9.20 years, and 6.65 years for non-significant articles. Articles with statistically significant results had an average quality rating of 7 stars (range = 6–9 stars); articles with non-significant findings had an average quality rating of 6.50 stars (range = 4–9 stars).

Discussion

Overall, findings from this systematic review suggest that the evidence base supporting longitudinal associations between positive and negative parenting practices in childhood and adolescent symptoms of depression, anxiety, and internalizing problems is inconsistent, and that this area in itself is understudied. Of the ten articles that described the long-term impacts of positive parenting practices, only four presented statistically significant findings. Similarly, only five of the 15 articles that examined negative parenting practices presented statistically significant associations with adolescent depression, anxiety, and/or internalizing problems. There were no substantial differences between articles with positive and null findings regarding methodological quality, or follow-up duration. However, there was substantial heterogeneity between articles in terms of examined parenting practices and outcomes, statistical adjustment for covariates, and analytic approaches. These findings are in line with those found in prior systematic reviews [24, 44], which have highlighted limitations of existing prospective studies in this area, and further extend these reviews by including prospective articles that span multiple periods of development. Limitations of the current body of evidence, strengths and limitations of this review, and implications for future research are highlighted below.

These findings serve to highlight the major limitations of existing studies that have examined longitudinal associations between parenting and long-term risk of depression, anxiety, or internalizing symptoms. First, although this review includes articles that describe a substantial number of different parenting practices, methods of measurement varied substantially, and only a few parenting practices were examined across several articles. In detail, 10 positive parenting practices were examined across 10 included articles, and

Table 3 Relationships between positive parenting practices and internalizing symptoms

Article	Exposure	Outcome	Newcastle–Ottawa Scale rating (/10)	Analysis	Results
Bellamy and Hardy [53]	Parental consistency	Depression	9	Hierarchical multiple regression	No significant relationships between parental consistency at ages 4–8 and offspring depression at ages 16–20 in boys or girls (p's > 0.05) in mixed or biological parent samples
Davis, Votruba-Drzal, and Silk [49]	Warmth/sensitivity	Internalizing	6	Correlation	Parental warmth/sensitivity (average of scores at 6 months to 4.5 years) associated with significantly lower internalizing symptoms at ages 10, 11, 12, and 15 (p's < 0.05)
Duchesne et al. [54]	Maternal warmth	Anxiety	5	Correlation	No significant correlation between maternal warmth at age 6 and anxious symptoms at age 12 ($r = -0.04$, $p > 0.05$)
Feng et al. [51]	Parental acceptance	Depression	8	Hierarchical multiple regression	No significant association between parental acceptance at age 9 and depressive symptoms at age 10 in girls after adjustment; for girls with low-to-moderate sadness regulation, higher parental acceptance associated with lower depressive symptoms ($p < 0.05$)
Ginsburg et al. [55]	Granting of autonomy Positive affect Self-efficacy	Anxiety	4	Correlation	No significant correlations between positive parenting practices at ages 5–8 and anxiety symptoms at ages 12–13 (r's from 0.04 to 0.28, p's > 0.05_
Kuhlman, Olson, and Lopez-Duran [50]	Warmth Nonaggressive inductive discipline	Internalizing	7	Multiple regression	Parental warmth at age 6 associated with lower internalizing symptoms at age 11 ($p < 0.01$); no significant relationship between non-aggressive inductive discipline and internalizing symptoms
Lansford et al. [57]	Proactive parenting	Internalizing	5	Correlation	No significant correlation between proactive parenting at kindergarten and internalizing symptoms in grade 8 ($r = 0.00$, $p > 0.05$)

Table 3 (continued)

Article	Exposure	Outcome	Newcastle–Ottawa Scale rating (/10)	Analysis	Results
Nikitopoulos et al. [56]	Maternal responsiveness	Affective and anxiety disorders	8	Multiple regression	No significant relationship between maternal responsiveness at 3 months and affective or anxiety disorders at age 15 (p's = 0.69, 0.64 respectively); no significant interactions between maternal responsiveness and DRD4 genotypes
van der Voort et al. [58]	Maternal sensitivity: - Maternal supportive presence - Maternal clarity of instruction - Maternal sensitivity and timing	Internalizing: - Withdrawn behavior - Anxious-depressed behavior	5	Correlation	No significant correlations between maternal sensitivity items, measured at 12–30 months and at 7 years, and internalizing outcomes at age 13 (r's from − 0.11 to 0.05, p's > 0.05)
Williams et al. [52]	Responsiveness to infant crying: - Pick up immediately - Never pick up until parent ready - Leave, pick up if crying does not stop (reference variable)	Depression	7	Logistic regression	Picking up immediately and picking up when ready (at ages 4 weeks, 6 months) not significantly associated with offspring depression at age 18 in complete cases or imputed models after adjustment (OR's from 0.81 to 2.06); in combined model with complete cases, picking up when ready associated with offspring depression, OR = 2.32 (95% CI: 1.03–5.22)

Table 4 Relationships between negative parenting practices and internalizing symptoms

Article	Exposure	Outcome	Newcastle–Ottawa Scale rating (/10)	Statistical analysis	Results
Baumrind et al. [59]	Confrontive discipline Household management Physical punishment Severe physical punishment Verbal hostility Psychological control Arbitrary discipline Unqualified power assertion	Internalizing	6	Multiple regression	Severe physical punishment and unqualified power association at age 4: trend with higher internalizing symptoms at age 15 (p's < 0.1); arbitrary discipline ($p < 0.05$), psychological control ($p < 0.01$), and verbal hostility ($p < 0.01$) significantly associated with higher internalizing symptoms; relationships with remaining practices not significant (p's > 0.1)
Bellamy and Hardy [53]	Hostile punitive parenting	Depression	9	Hierarchical multiple regression	No significant relationships between hostile punitive parenting at ages 4–8 and offspring depression in boys or girls at 16–20 (p's > 0.05) in mixed or biological parent samples
Cecil et al. [62]	Harsh parenting	Emotional difficulties	6	Path analysis (regression)	No significant relationship between harsh parenting at age 3 and offspring emotional difficulties at age 12 ($p > 0.05$)
Davis, Votruba-Drzal, and Silk [49]	Negative emotionality Maternal hostility Maternal harsh discipline	Internalizing symptoms	6	Correlation	- Negative emotionality at 6 months associated with significantly higher internalizing symptoms at ages 10, 11, and 15 - Maternal hostility at 6 months associated with significantly higher internalizing symptoms at ages 10, 11, 12, and 15 - No significant associations between maternal harsh discipline at age 4.5 and internalizing at ages 10, 11, 12, and 15
Duchesne et al. [54]	Maternal discipline	Anxiety	5	Correlation	No significant correlation between maternal discipline at age 6 and symptoms of anxiety at age 12 ($r = -0.01$, $p > 0.05$)

Table 4 (continued)

Article	Exposure	Outcome	Newcastle–Ottawa Scale rating (/10)	Statistical analysis	Results
Ezpeleta et al. [63]	Rearing style (composite measure): - Parental monitoring - Parental discipline - Physical punishment - Emotional expression	Internalizing	5	Multiple regression	No significant association between rearing style measured at age 9, and internalizing at age 10; significant association between high risk rearing style and higher internalizing at age 11 ($p < 0.05$)
Feehan et al. [64]	Parental discipline	Internalizing	7	Logistic regression	No significant association between parental discipline at ages 7–9 and internalizing symptoms at age 15 after adjustment ($p > 0.05$)
Feng et al. [51]	Psychological control	Depression	8	Hierarchical multiple regression	No significant association between psychological control at age 9 and depressive symptoms at age 10 in girls after adjustment; for girls with low-to-moderate positive emotion, higher psychological control associated with higher depressive symptoms ($p < 0.05$)
Ginsburg et al. [55]	Overcontrol Negative affect Anxious behavior Criticism	Anxiety	4	Correlation	No significant correlations between negative parenting practices at ages 5–8 and anxiety symptoms at ages 12–13 (r's ranging from 0.04 to 0.28, p's > 0.05_
Hannigan, McAdams, and Eley [65]	Harsh discipline Parental feelings (negativity)	Depressive symptoms	7	Correlation	- In boys, correlations between discipline, parental feelings at age 9, and depressive symptoms at ages 12 and 16 ranged from $r = 0.04$ to 0.18 (no p-values provided) - In girls, correlations between discipline, parental feelings at age 9, and depressive symptoms at ages 12 and 16 ranged from $r = 0.04$ to 0.21 (no p-values provided)
Kuhlman, Olson, and Lopez-Duran [50]	Harsh discipline	Internalizing	7	Multiple regression	No significant relationship between harsh discipline at age 6 and internalizing symptoms at age 11 after adjustment for baseline internalizing and other parenting dimensions ($p > 0.05$)

Table 4 (continued)

Article	Exposure	Outcome	Newcastle–Ottawa Scale rating (/10)	Statistical analysis	Results
Leve et al. [60]	Harsh discipline	Internalizing	9	Latent growth curve modeling	Significant relationship between harsh parental discipline at age 4 and higher internalizing symptoms in boys at age 12 after adjustment ($p < 0.05$); relationship not significant in girls
Lewis-Morrarty et al. [61]	Maternal overcontrol	Social anxiety	6	Regression	Significant relationship between parent-reported maternal overcontrol at age 7 and symptoms of social anxiety at age 14–17 ($p < 0.01$); significant interaction between overcontrol and behavioral inhibition on symptoms of social anxiety ($p < 0.05$)
Mesman and Koot [66]	Harsh parenting Negative parental attitude	Internalizing	9	Logistic regression	No significant associations between harsh parenting at ages 2–3 and internalizing at 10–11 before or after adjustment; significant univariate association between negative maternal attitude and internalizing (OR = 2.13, 95% CI: 1.12–4.04), significantly attenuated after adjustment
Prinzie et al. [67]	Overreactive parenting	Internalizing	6	Correlation	Correlations between overreactive parenting at age 8 and internalizing at ages 11 and 14 not significant (r's ranging from 0.12 to 0.17, p's > 0.05)

only responsiveness, warmth, and sensitivity were examined in more than one study. Similarly, eight different negative parenting practices were examined across 15 articles, six of which were examined in three or fewer articles. Furthermore, five of the included articles utilized direct observation, and 14 utilized parent-reported questionnaires, the latter of which may be more prone to information bias. A dearth of available articles across the examined parenting practices, as well as variability in measures used to examine parenting practices, contributed to our inability to conduct meta-analyses. Second, in addition to a wide array of examined parenting practices, the included articles also conceptualized and measured outcome variables in a number of different ways. Although including articles that examined depressive symptoms, anxiety symptoms, and/or internalizing symptoms enhances generalizability of our findings and is appealing for informing transdiagnostic approaches to preventing and treating anxiety and depression, interpreting associations between specific parenting practices and specific mental health outcomes is challenging given the substantial heterogeneity in definitions and measures used across articles. Third, statistical adjustment for covariates across included articles was inconsistent—nine of the 18 included articles did not adjust for important covariates including parental psychopathology, socioeconomic status, and child sex or gender. Furthermore, only 2 of the 18 included articles adjusted for baseline depression, anxiety, or internalizing symptoms of children. As a result, findings from many of the included articles may be prone to residual confounding, which may, in part, explain inconsistent findings across articles. Fourth, the articles included in this review varied substantially in length of follow-up of study subjects; specifically, follow-up lengths ranged from 1 to 18 years. Articles with shorter follow-up durations may be prone to reverse causality; conversely, articles with longer follow-up durations may miss periods where children experienced clinically significant symptoms of anxiety or depression. Fifth, the included articles varied substantially in their analytic approaches and in reporting of results, which, in concert with other mentioned limitations, precluded our ability to conduct meta-analyses. Finally, the low number of studies included reflect that this area in itself is relatively understudied, and would thus benefit from continued longitudinal research that addresses the above-highlighted limitations.

Effect sizes may be weaker for longitudinal studies examining the role of specific parenting practices on child and adolescent mental health for a myriad of reasons. First, most of the included studies examined individual parenting practices, but it is possible that parenting practices may have additive effects on child outcomes; some studies have demonstrated additive effects of different parenting practices (e.g., control and rejection) on child mental health [68]. Second, it is possible that parenting has indirect effects on adolescent depression and anxiety—for example, relationships may be mediated through socioemotional factors including behavioral inhibition and sadness regulation [51, 69]. Third, relationships between parenting and child mental health may be bidirectional [26–28]; parenting can impact child mental health and behavior, but child behavior may also stimulate or reinforce certain responses in parents (e.g., harsh disciplinary practices). These reciprocal relationships may ultimately have complex and compounded impacts on long-term mental health that are challenging to ascertain [22, 23, 70]. Finally, some longitudinal studies vary in whether parents or children report parenting and mental health data; measurement error may be introduced into studies that use different informants for exposure and outcome data [71], or for studies that rely on self-reported data from younger children [72].

This review itself also has a number of limitations to consider. Given the varied ways in which the included articles both defined and measured parenting practices, it is possible that our search strategy excluded some studies that have examined potentially important parenting practices. However, to address this issue, we scanned reference lists of included articles, as well as citing articles of included articles, to capture references that may have been missed in electronic database searches to the best of our ability. In addition, because of the limited number of included articles, particularly when considering the diverse range of examined parenting practices and outcomes, we were unable to conduct meta-analyses; by extension, we were not able to meaningfully examine the roles of important covariates like age, gender, or socioeconomic status on associations between parenting practices in childhood and depression, anxiety, or internalizing symptoms in adolescence. Furthermore, although broadly categorizing parenting practices into "positive" and "negative" categories aids in interpretation of findings and is in line with the existing literature, this categorization does not adequately capture how varying parenting practices may differentially act on adolescent depression, anxiety, and/or internalizing symptoms. Parenting practices are also likely to vary over the course of childhood—for example, parenting practices may differ for infants or toddlers compared to primary-school aged children. Utilizing a wide range to define childhood thus limits our ability to distinguish the impacts of parenting practices measured at different points of children's development. Finally, because we were unable to meta-analyze included articles and thus examine the role of ethnicity as a moderating variable, our findings may not be generalizable across ethnic groups or cultures. It has been suggested that ethnicity may be an important moderator of the associations between specific parenting practices, including harsh discipline, and child risk of depression and anxiety [73–75]; cultural norms for what constitutes appropriate versus inappropriate parenting

behaviors also vary [73]. For example, a study by Varela et al. demonstrated that relationships between parental hostile control and anxiety symptoms were significant in European–American adolescents, but not in Latin-American adolescents [76]. Another study by Pachter et al. [77] suggested that parenting practices had differential impacts on child behavior in white, Black, and Latino samples.

These limitations are also offset by a number of strengths. First, we conducted this review in adherence to PRISMA guidelines, which provide clear and rigorous criteria for the reporting of systematic reviews and meta-analyses [39]. Second, this review examines depression, anxiety, and internalizing behaviors; this breadth is beneficial for informing transdiagnostic approaches to the prevention and treatment of both depression and anxiety. Third, we have addressed major limitations of existing systematic reviews and meta-analyses in this area by focusing on longitudinal research, including studies that span multiple developmental periods, and including a wide range of parenting practices that are not bound by theoretical frameworks. Finally, this review is the first, to our knowledge, to summarize the prospective, longitudinal evidence base examining associations between parenting practices measured in childhood, and adolescent risk of depression, anxiety, or internalizing symptoms, thus providing a much-needed synthesis of this body of literature.

To date, the few studies that have examined the longitudinal relationships between childhood parenting practices and adolescent depression, anxiety, and internalizing symptoms demonstrate inconsistent findings. This may be due to a number of reasons, including but not limited to heterogeneity of exposure and outcome definitions and measurement methods, varying follow-up durations, measurement error, residual confounding, and the possibilities that parenting practices may have additive, indirect, or reciprocal effects on adolescent mental health that are difficult to ascertain. Despite these limitations, parenting still remains an important and modifiable target for prevention and intervention strategies designed to improve child health and wellbeing. This is supported by emerging evidence from longitudinal studies demonstrating clear and positive impacts of interventions designed to modify negative parenting practices (e.g., harsh discipline) and foster positive practices (e.g., warmth); in detail, these studies have demonstrated long-term reductions in internalizing and externalizing symptoms, improved relationship quality with peers and family members, and improved school performance [18–21]. A recent meta-analysis further supports the meaningful effects of preventive parenting programs on child anxiety and depression, with positive effects lasting as long as 15 years post-intervention [19]. Thus, the current review best serves to highlight limitations of the existing literature, and provides a number of areas in which researchers may seek to conduct additional research to strengthen and extend the current evidence base. Examining potentially understudied parenting practices, including granting of autonomy, parental monitoring, and harsh criticism; investigating the roles of important confounding and/or moderating variables, including gender, socioeconomic status, age, and ethnicity; studying cohorts with multiple follow-up assessments over an extended period of time to better ascertain bidirectional or indirect effects; studying the impacts of parenting practices during discrete developmental periods (i.e., infancy, toddlerhood, and primary-school ages) on adolescent mental health outcomes; and studying diverse samples to improve generalizability of findings represent important areas for future inquiry.

This systematic review demonstrates that the evidence base for longitudinal research examining associations between positive and negative parenting practices in childhood and symptoms of depression, anxiety, and internalizing behaviors in adolescence is limited and inconsistent. Findings from this review thus serve to highlight a number of limitations in the existing literature, and identify a number of understudied parenting dimensions that require continued research, particularly through prospective, longitudinal study designs. However, despite limitations in the current evidence base, parenting still represents an important target for prevention and intervention efforts, given a growing number of studies that demonstrate positive long-term impacts of parenting programs.

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Compliance with ethical standards

Conflict of interest The authors have no conflicts of interest to declare.

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